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Science Grade Level Expectations for Development of the CRT

Grades Pre-Kindergarten -10 and 12
Science

Pre Kindergarten	<ol style="list-style-type: none"> 1. Identifies what is safe, and what is dangerous. 2. Identifies simple substances as solids and liquids. 3. Identifies a set of animals and identify their environments (e.g., fish-water, deer-forest) 4. Names Earth's features (e.g., mountain, hill, valley) 5. Identifies basic technology used in society (e.g., telephones, vehicles)
Kindergarten	<ol style="list-style-type: none"> 1. Asks appropriate questions after sharing a common experience. 2. Demonstrates knowledge of matter. <ol style="list-style-type: none"> A. Identifies solids liquids and gases(e.g. Ice, water, vapor [breath on a cold day]) B. Explains experiences with light, magnetism, and motion. 3. With directions, identifies living (biotic) and non-living (abiotic) objects; groups objects based on attributes. 4. Names Earth's features and builds models of local features. 5. Identifies and demonstrates different uses of technology(e.g. telephone, computer, DVD, VHS)
Grade 1	<ol style="list-style-type: none"> 1. With step by step directions, does a simple investigation. 2. Demonstrates knowledge of matter. <ol style="list-style-type: none"> A. Selects and uses simple tools for simple measurement of solids, liquids, and gases. B. Demonstrates experiments with light (e.g. prisms, and mirrors) 3. Illustrates a simple food chain with herbivores, carnivores. 4. Demonstrates knowledge of Earth and objects in space. <ol style="list-style-type: none"> A. Identifies Earths, features, .ponds, lakes, deserts. B. Describe causes of day and night with respect to the sun and identify constellations (e.g. Big Dipper, Little Dipper) 5. Identifies and explains technologies used in school.
Grade 2	<ol style="list-style-type: none"> 1. Completes a simple investigation and communicates results. 2. Demonstrates knowledge of matter. <ol style="list-style-type: none"> A. Creates mixtures and separates them(e.g. oil and water, soil and iron filings B. Describes a mechanical system. 3. Compares three features of plant and animal life cycles. 4. Describes and illustrates Earth's features and identifies seasonal and weather changes. 5. Provides examples of how people use various types of technologies.

Grade 3	<ol style="list-style-type: none">1. With direction, safely completes a simple investigation (direct inquiry) by asking questions with identified variables using appropriate tools, and communicates results. Identifies that observation is a key inquiry process used by American Indians.2. Selects and safely uses tools for the simple measurement of each state of matter; identifies physical properties of matter and their relative location (e.g. size, shape, color, texture, and state of matter.)3. Classifies living things based on similarities and differences in behavior, basic structure, function, life cycle, and energy needs.4. Recognizes and describes Earth's features, illustrates changes of those features. Recognizes and describes changes in weather and seasons. Identify objects in the sky. (e.g. moon, stars, sun, planets)5. A. Recognizes how technology, science and society are connected; recognizes Montana American Indian contributions. B. Recognizes that science can help us understand our local problems.6. List the occupations that historically use science, (e.g. doctor, veterinarian, pharmacist, ethno botanist) including Montana American Indian examples.
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Grade 4	<ol style="list-style-type: none">1. With direction, safely completes a simple investigation (direct inquiry) by asking questions with identified variables, using appropriate tools, and communicates results with appropriate data. Identifies that observation is a key inquiry process used by Montana American Indians.2. Selects and safely uses tools for the simple measurement of each state of matter; identifies, describes and models characteristics of properties within physical and mechanical systems. (e.g. magnetism, motion, heat, light, and mixtures)3. Identifies attributes of living (biotic) things and non-living (abiotic) objects, including classification based on similarities and differences in instinctual, inherited, and learned behaviors; basic structure and function, and life cycle processes including energy needs of each system.4. Identifies and accurately illustrates Earth's features, locating several observable changes of those features (e.g. erosion, weathering). Observes and records changes in weather (e.g. water cycle). Identifies patterns of movement of stars, moon, sun, and planets. Investigates and makes inferences from fossils.5. A. Identifies interactions among technology, science, and society; recognizes Montana American Indian contributions. B. Discusses and explains how scientific information is related to current events and local problems.6. Lists the occupations that historically use science, (i.e. doctor, veterinarian, pharmacist, ethno botanist) including Montana American Indian examples. Identifies their impact on societies.
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Grade 5	<ol style="list-style-type: none">1. Identifies a testable question, safely plans and conducts experimental investigations, and communicates results. Recognizes that observation is the key inquiry process for Montana American Indians.2. Selects and safely uses tools for the simple measurement of each state of matter. Identifies physical interactions involving changes in energy. Identifies, describes, and models characteristics of properties and basic physical, chemical, and mechanical changes (e.g. forces in motion, work, and power).3. Applies knowledge, including classification, based on similarities and differences in basic structure and function, and life cycle processes of each system (e.g., photosynthesis, respiration, transpiration, symbiotic relationships, adaptations; ecosystems and food chains).4. Identifies and accurately illustrates Earth's features, locating several observable changes of those features, identifies the causes of those changes, and applies the knowledge. Recognize how wind, water, time, and geological shifts affect the earth's surface. Identifies and describes patterns of movement and features of stars, moon, sun, and planets.5. A. Explains how technology, science, and society are connected; relates how science and technology are utilized by Montana American Indians. B. Observes and discusses scientific information related to current events and local problems.6. Lists the occupations that historically use science, (i.e. doctor, veterinarian, pharmacist, ethno botanist) including Montana American Indian examples. Identifies the impacts on past and present societies.
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Grade 6	<ol style="list-style-type: none">1. Student safely conducts and evaluates a simple investigation; identifies variables and controls, and communicates results with appropriate data. Identifies that observation is the key inquiry process used by Montana American Indians.2. Given supporting details, describes the physical world of matter, forces and energy, including physical & mathematical models.<ol style="list-style-type: none">a. Identifies matter, and classifies by physical and chemical properties.b. Identifies gravity, motion, and magnetism.c. Identifies the types and changes of energy, and describes simple machines.3. Identifies the structures and functions of living things, identifies the diversity of life in both the micro & macro world, and describes the interactions of living organisms with biotic and abiotic factors.4. Describes the interactions of the Earth's lithosphere, hydrosphere, and atmosphere; identifies the components of the universe.<ol style="list-style-type: none">a. Identifies the structure and processes of the Earth.b. Identifies the components of the atmosphere and identifies Montana's weather and climate.c. Identifies the components of the universe (i.e. solar systems, stars, and galaxies) and identifies different methods of space exploration.5. <ol style="list-style-type: none">A. Identifies connections and interactions between technology science, and societies.B. Identifies scientific information related to current events.C. Identifies how science and technology have impacted Montana American Indians.6. Identifies examples of how science and technology are the results of human activity throughout history, including Montana American Indian contributions.
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Grade 7& 8	<ol style="list-style-type: none"> 1. Identifies and communicates testable questions, safely designs and conducts experimental investigations using appropriate tools and metric measurements, identifies dependent and independent variables, controls, and communicates results with appropriate data. Identifies that observation is the key inquiry process use by Montana American Indians. 2. Given supporting details, describes the physical world of matter, forces and energy, including physical, conceptual and simple mathematical models. <ol style="list-style-type: none"> a. Classifies matter, and describes simple chemical reactions, and chemical formulas. b. Describes gravity, motion, magnetism, and Newton's Laws of Motion. c. Classifies the types of energy, transformation and conservation of energy, and analyzes simple and complex machines. 3. Identifies and communicates the structures & functions of living things, describes the processes and diversity of life in both the micro and macro world, and explains the interactions of living organisms with biotic and abiotic factors. 4. Describes and explains the interactions of the Earth's lithosphere, hydrosphere, and atmosphere; describes the components of the universe. <ol style="list-style-type: none"> a. Describes and explains the structure and processes of the Earth. b. Describes and explains the components of the atmosphere and how they interact to create weather & climate. c. Describes and explains components of the universe (i.e. solar systems, stars, and galaxies) and how they have been discovered. 5. A. Describes connections and interactions among technology science, and society, by applying scientific inquiry. B. Describes scientific information related to current events and the impact on regional problems. C. Describes and explains how science and technology have impacted Montana American Indians. 6. Independently identifies and describes examples of how science and technology are the results of human activity throughout history, and with direction, seeks new information that connects past to present, including Montana American Indian contributions.
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Grades 9 & 10	<ol style="list-style-type: none">1. Generates testable questions, safely designs and conducts controlled investigations, uses SI (metric system), makes logical inferences based on observations, interprets data by analyzing the strengths and weaknesses in an investigation design, modifies investigation design based upon experimentation, and communicates results. Identifies that observation is the key inquiry process used by Montana American Indians.2. Uses physical, mental, conceptual, and simple mathematical models to investigate classroom and group- generated problems and/or questions about;<ol style="list-style-type: none">a. basic chemical phenomena including atomic theory and interactions of matter.b. basic physical phenomena including kinematics and energy transformations.3. Organizes, classifies, and describes interactions of the biotic and abiotic parts of the biosphere as well as the natural history of interactions of life on Earth and uses these skills to recognize and help solve problems ranging from the sub-cellular level through the ecosystem level.4. Describes, explains and begins to develop basic models of the processes that occur in the lithosphere, hydrosphere and atmosphere and describes the components of the universe.5. Using methods of scientific inquiry, identifies and communicates, through a variety of means, connections and interactions among technology, science, and society including how these have impacted the Montana American Indian.6. <ol style="list-style-type: none">A. Makes decisions about scientific and social issues based on observations, data, analysis, and knowledge of the natural world, and communicates those decisions to othersB. Identifies the positive and negative impacts of past, present, and future technological and scientific advances and with direction, gives possible solutions to problems that affect local, regional, and global communities.C. Explains attributes of Montana American Indian contributions to scientific and technological knowledge.
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Grade 11 & 12	<ol style="list-style-type: none">1. Generates testable questions, safely designs and conducts controlled investigations, using SI (metric system), and makes logical inferences based on observations, accurately interprets data by analyzing the strengths and weaknesses in an investigation design based upon experimentation, and effectively communicates results. Identifies that observation is the key inquiry process used by Montana American Indians.2. Uses physical, mental, theoretical, and more complex mathematical models to investigate <u>individually</u>-generated problems and/or questions about...<ol style="list-style-type: none">a. chemical phenomena including atomic theory and interactions of matter.b. physical phenomena including complex kinematic interactions.3. Organizes, classifies, and describes interactions of the biotic and abiotic parts of the biosphere, as well as the natural history of interactions of life on Earth, and uses these skills to solve related, problems novel to the student ranging from the sub-cellular level through the ecosystem level.4. Describes, explains and models the processes that occur in the lithosphere, hydrosphere, and atmosphere of the earth and universe.5. Using methods of scientific inquiry, identifies, analyzes and communicates, through a variety of means, connections and interactions among technology, science, and society including how these have impacted the Montana American Indian.6. A. Makes informed decisions about scientific and social issues, based on observations, data analysis, and knowledge of the natural world, and effectively communicates those decisions to others. B. Identifies the positive and negative impacts of past, present, and future technological advances, and gives possible solutions that may minimize the negative impacts on the global community. C. Explains and analyzes attributes of Montana American Indian contributions to science knowledge and to the application and use of technology.
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